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(54) Point-of-sale equipment

(57) POS equipment (10) for printing either a cheque or a credit/charge card sales voucher includes means (16) to read magnetically coded information from a customer-presented card and printing means to print information in human readable form on a cheque or voucher, that information including at least a monetary amount in words and/or numbers, means designating the payee and, at least in the case of a voucher, data read magnetically from the card.

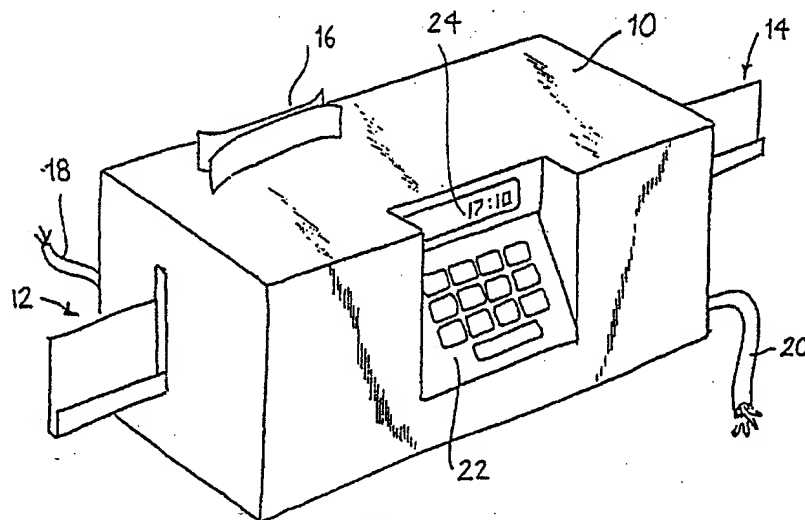


FIG. 1

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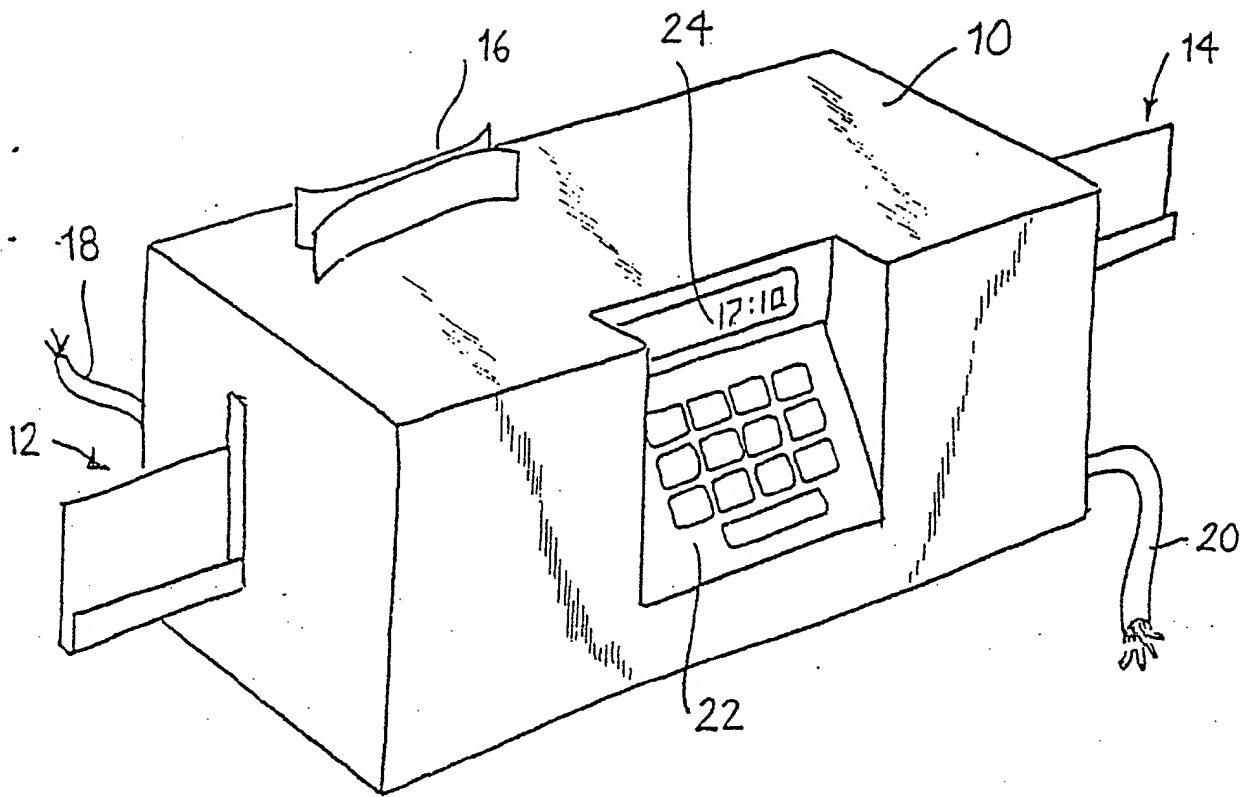


FIG. 1

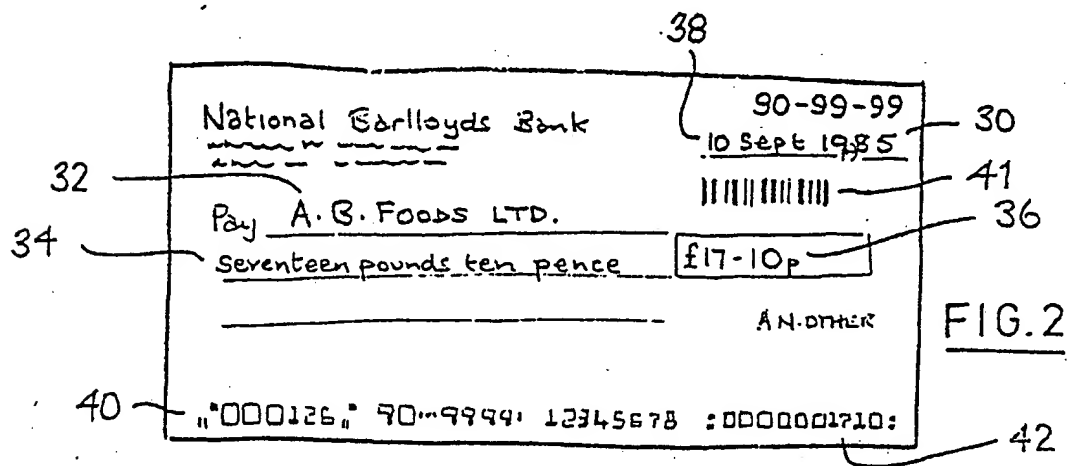


FIG. 2

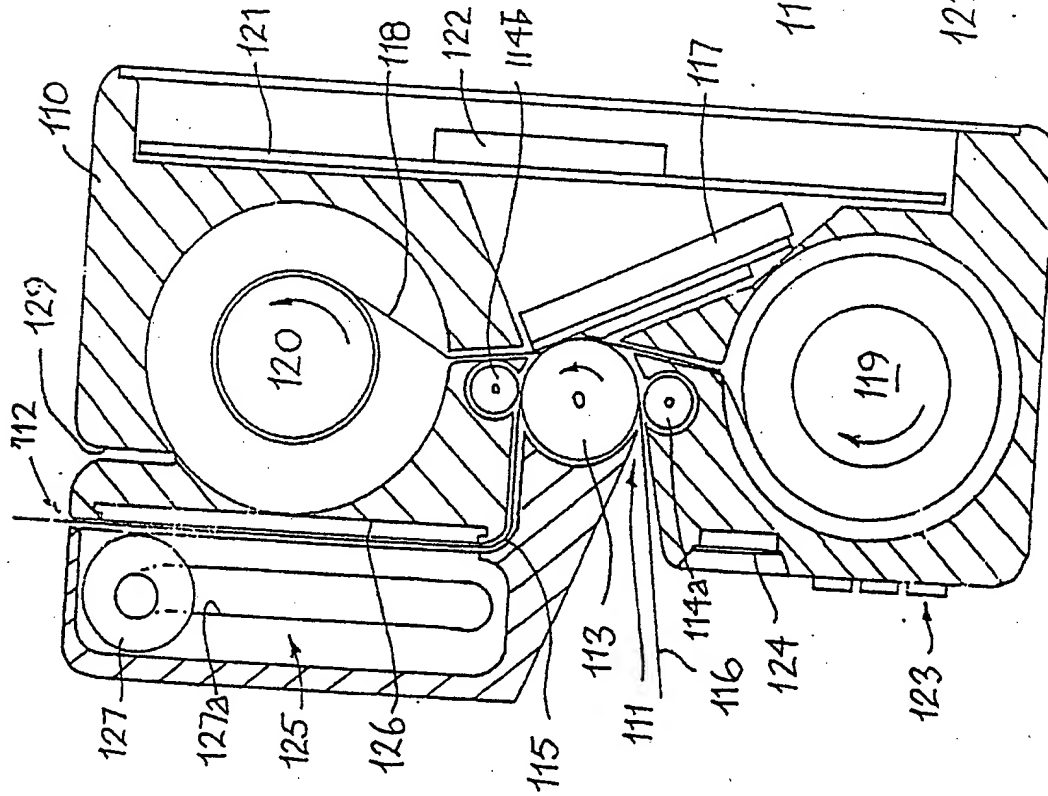


FIG. 3

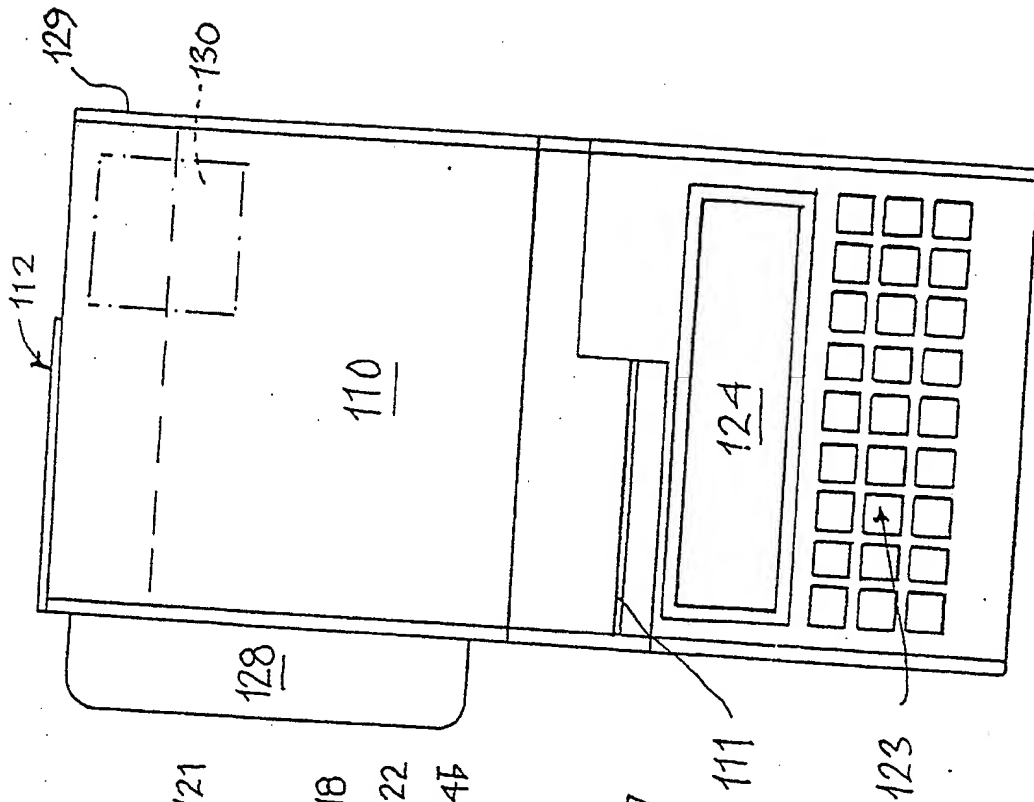
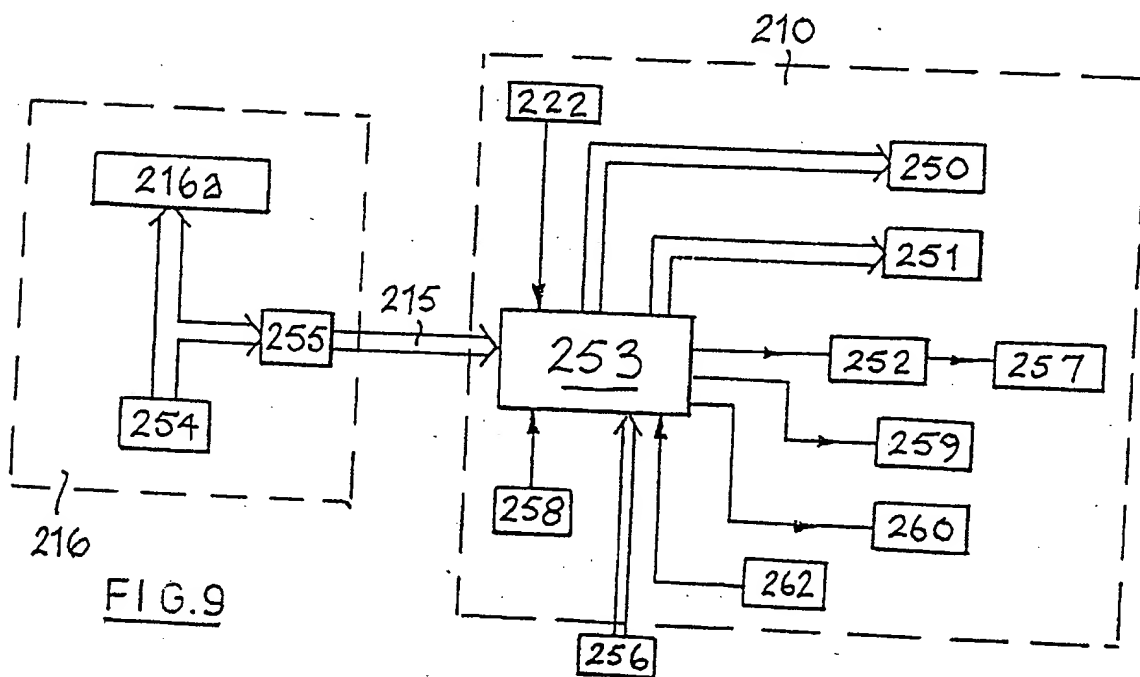
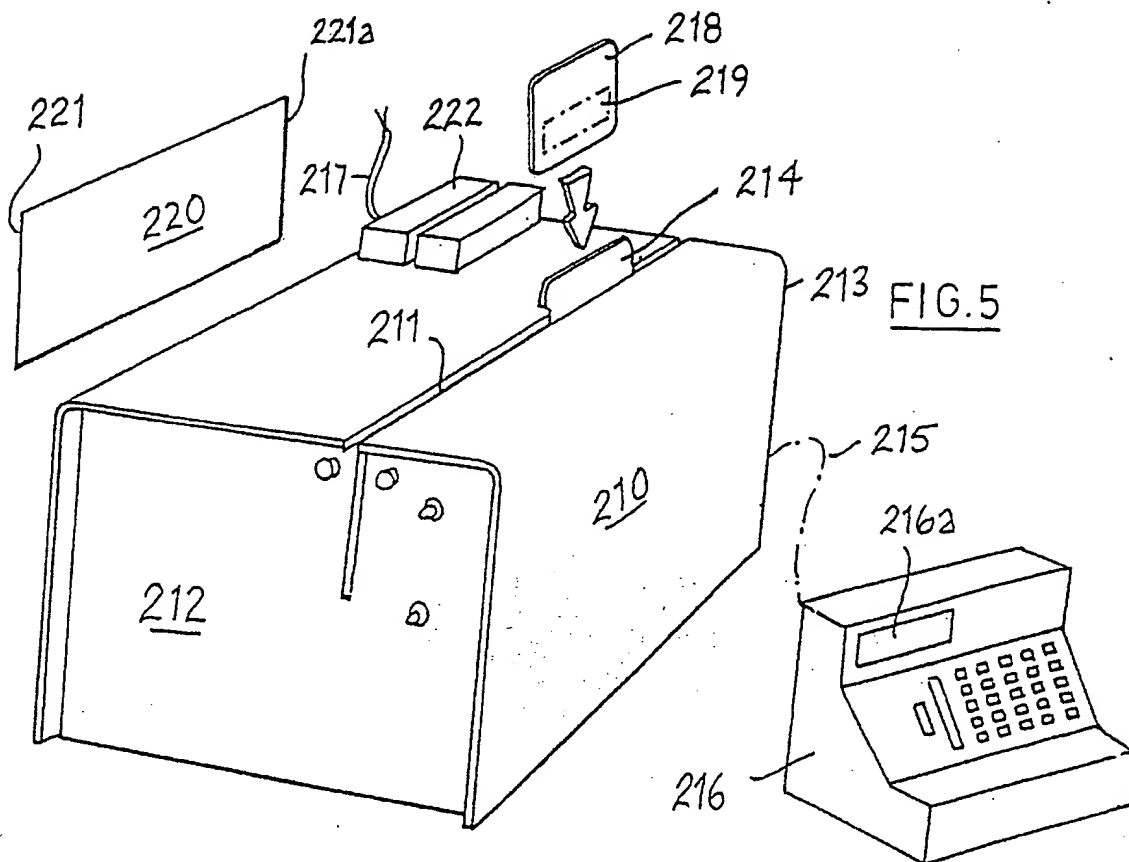


FIG. 4



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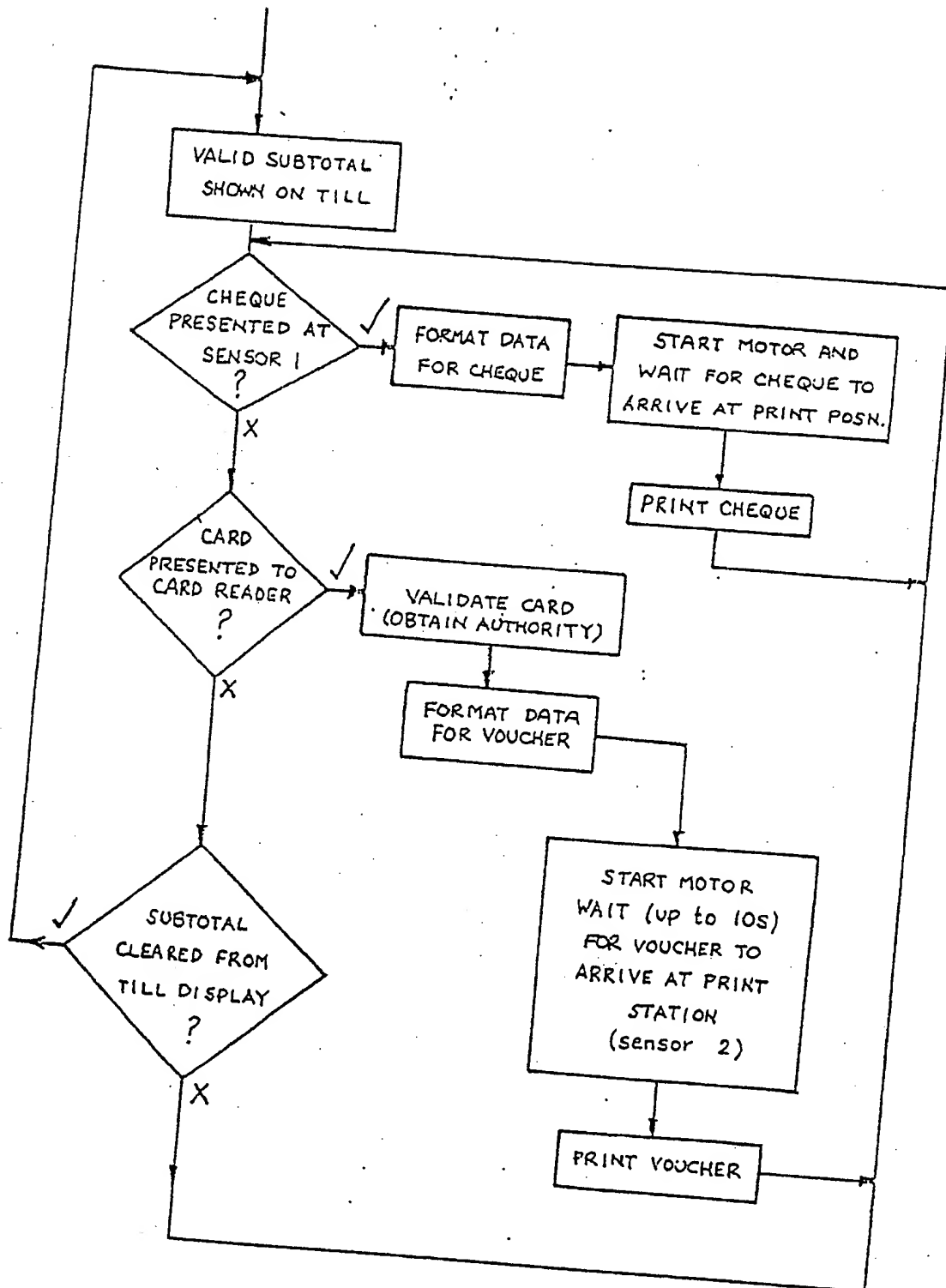


FIG. 6

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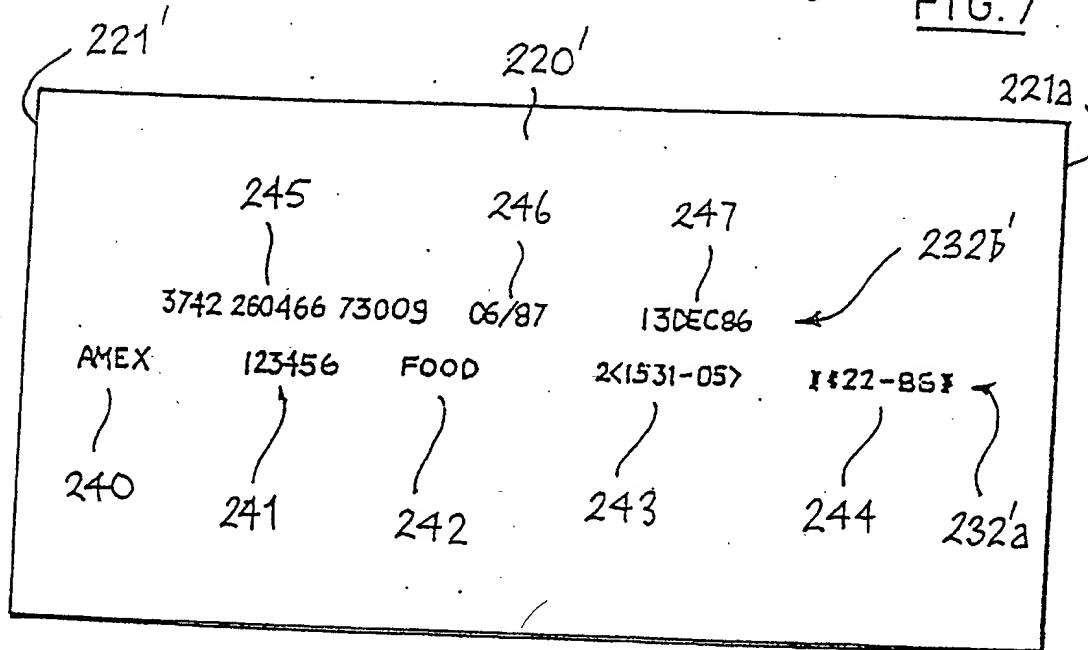
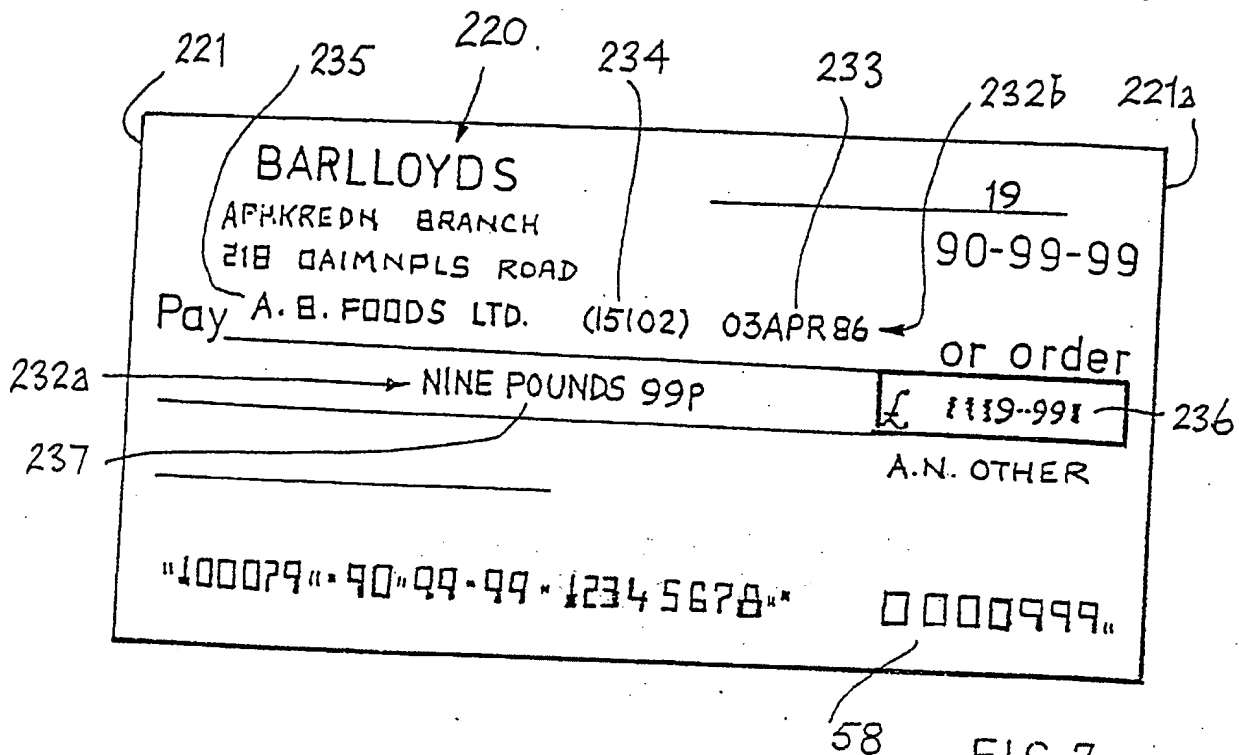


FIG. 8

SPECIFICATION

Improved point-of-sale equipment

5 This invention relates to improved document printing point-of-sale (POS) equipment for facilitating the completion either of a cheque or of a credit or charge card voucher required for POS transaction.

Market surveys indicate a need for equipment to be
10 used at a POS at print out a drawer's personal cheque, with every detail required by the payee should the customer wish to pay by cheque but to print a credit-charge card voucher should the customer wish to use such a card.
15 Such equipment would speed up the process of payment at a POS, making the transaction less arduous for the payer and reduce costs for the payee of the cheque or voucher.

Equipment in accordance with this invention seeks
20 to provide a ready means for preparing a cheque or voucher for signature.

According to the present invention improved document printing POS equipment comprises a housing, an inlet for receiving into the housing a cheque or a voucher to be printed, conveying means for moving a cheque or voucher fed into the inlet along a document path within the housing, means to read magnetically coded information from a customer-presented card inserted therein, and printing means
30 adjacent to the document path to print information in human readable form on a cheque or voucher on said path, that information including at least a monetary amount in words and/or numbers, means designating the payee and, at least in the case of a
35 voucher, data read magnetically from the card.

When it is a cheque that is to be printed, the printed information should be the payee's name, the monetary amount in both word and figure formats, and the transaction date. Possibly, the equipment also includes means to print in Magnetic Ink Computer Readout (MICR) characters the monetary amount on an E13B line of the cheque for the benefit of the Clearing Bank.

To facilitate end-of-period accounting, the equipment can include means to list and/or total the monetary amounts of all documents processed on the POS equipment during the said period. Alternatively the equipment can include a network connection enabling stored information to be downloaded to a remote computer terminal.
50

The monetary amount to be printed on the document can be inputted to the signal processing means via a series of keys on the housing but electrical impulses received from an adjacent cash till
55 (where a transaction total has been calculated) can be fed to the housing and automatically printed on the document fed into the housing.

Desirably the document conveying means is electrically powered to pass a blank cheque or voucher
60 from the inlet to the printing means, but it is not ruled out that manual means be provided to effect the required transport along the document path.

Preferably the equipment also includes means to determine whether the document presented is to be
65 printed as a cheque or as a credit/charge card sales

voucher.

The equipment can include an alpha-numeric display panel connected to the signal processing means so that information entered via a housing-mounted
70 keyboard or an adjacent till is displayed in human readable form on the display panel.

Conveniently the printing means is a thermal print head since this enables near-silent operation of the equipment to be achieved and an extensive enough
75 print area to cover wide ranges of different cheque and voucher formats. However one or more matrix dot printers could be used for printing information that varies from document to document and one or more fixed head printing means for non-variable information (such as a payee's name and sales code).

Suitably the means to read the magnetically coded information from a card is associated with a known form of card "swipe" unit. The "swipe" type unit could be a read-only unit or a read and write unit of
85 the Manual Swipe Type (e.g. a Panasonic 400 series) or of the Motor Driven Swipe Type (e.g. a Panasonic 200 series) and desirably is mounted on the housing. The magnetic code read means for the card can be linked to an optical MICR read means positioned to
90 scan the E13B line of a blank cheque fed into the inlet, thus permitting a comparison to be made between the sort codes (or possibly account numbers) on the card and blank cheque whereby an alarm means can be actuated and/or the equipment rendered inoperat-
95 ive if there is disconformity between the relevant read data. In a similar manner, the read expiry date of the card can be compared with the transaction date to similarly actuate an alarm means and/or render the equipment inoperative if the card is outdated.

The housing can also include an embossing station so that embossed information on the customer-presented card is printed on the document. This can be particularly useful when the document is a blank cheque.

The means to read the magnetically coded information can be on the housing but separated from the embossing station so that a card is applied differently to the housing if it is desired to read from its magnetically coded information or use its embossed region as a printing member.
110

The means for selecting which of a cheque or sales voucher is to be printed, can take a wide variety of forms, among which may be mentioned using a selector switch or a key on the housing, using a special code of key depressions where a keyboard is provided, providing means in the housing to sense whether a card is presented for use in an embossing station or is presented to be read magnetically, or providing means to sense whether the document presented has been specially coded (e.g. printed, perforated, shaped or coloured as a cheque or as a voucher).
115

Equipment according to the invention can be provided with one or more of a wide range of additional features including means to verify whether a presented card is outdated or included on a list of cards stolen or otherwise withdrawn from use, means to obtain an authorisation or validation code via a telephone line from the card issuing company, means to
120 link the signal processing means to a remote com-

putting system for effecting electronic funds transfer, means to produce a tally of transactions effected on the equipment during an accounting period (e.g. a visual display of the number and/or total value of the 5 transactions and/or a hard copy of such number and/or value).

Some embodiments of equipment according to the invention will now be described, by way of example, with reference to the accompanying 10 drawings, in which:

Figure 1 is a schematic representation of a first piece of POS equipment according to the invention, Figure 2 is a view of the front face of a blank cheque after being printed in the equipment of Figure 1,

15 Figures 3 and 4 show a schematic sectional view and a front view of a second piece of POS equipment.

Figure 5 is a view of a third piece of POS equipment linked to an adjacent cash register,

Figure 6 is a flow chart indicating how the equipment of Figure 5 operates,

Figure 7 shows the print format for a cheque produced on the equipment of Figure 5,

Figure 8 shows the print format for a voucher produced on the equipment of Figure 5, and

25 Figure 9 shows, in block diagram, the electronic equipment used in the equipment of Figure 5.

The equipment shown in Figure 1 comprises a housing 10 containing conveying and printing means for a blank cheque, the inlet for the cheque being shown at 12 and the outlet at 14. 16 is a card reader of the swipe type, 18 a lower lead for the equipment and 20 a data bus line from an adjacent till (not shown).

To use the equipment shown in Figure 1 during a 35 POS transaction, data identifying the total cost of the transaction is fed into the housing 10 via the line 20. If a blank cheque from the drawer's bank is presented to the inlet 12 front face forward, the cheque will be drawn by document conveying means into a printing 40 station within the housing. The cheque pauses in the printing station and the date, the payee's name and the amount of the transaction in word and figure formats are printed on the front face of the cheque.

In the case of the printing of a credit/charge card 45 voucher the customer's card would be "swiped" through the card reader 16 to prepare the equipment for voucher printing. If the magnetic code on the card has been correctly read, a voucher subsequently applied to the inlet 12 will be drawn into the housing 50 and printed with information relevant to a voucher. This will include the monetary amount, the POS merchant's code, the transaction date and, read from the card, at least the card number.

The information for the transaction amount on 55 both cheque and voucher can be derived via the line 20 from the adjacent cash till but the equipment shown in Figure 1 also includes a key board 22 for entering the amount manually into a memory of the equipment, the entered amount being displayed on 60 an LCD readout panel 24.

Following completion of the front face printing operation within the housing, the printed document appears at the outlet 14 ready for checking by the customer and subsequent signing.

65 Figure 2 shows the front face of a typical cheque

blank 30 after printing.

Referring to Figure 2, the date entered is shown at 38, the payee at 32, the transaction amount in words at 34, and in figures at 36. A further print out in MICR 70 characters on the E13B line 40 is shown at 42 (this being the monetary amount in figure) and this can be a highly desirable addition, since it may qualify for a small payment from the Clearing Bank to the payee.

The equipment shown in Figures 3 and 4 comprises a housing 110 which has a document inlet 111 and a document outlet 112. A document drive drum 113 (drivable in the direction of the arrow by motor means - not shown) cooperates with idler rolls 114a, 114b and a passageway 115 to define a document 80 conveying means for moving a document along a paper path (shown by line 116) through the housing from the inlet to the outlet.

Adjacent to the path 116 is a thermal print head 117 which coacts with a thermally sensitive printing 85 ribbon 118 to print information in human readable form on a document passing along the path 116 as the document passes around the drum 113.

A supply roll 119 feeds fresh ribbon 118 to the print head 117 and spent ribbon is collected on a takeup 90 roll 120.

The print head 117 can extend (in the direction normal to the plane of the drawing of Figure 3) to cover the full width of possible printed areas on documents fed to the equipment and this is preferred. 95 However, the full print width can be covered by a plurality of print heads disposed side-by-side or by moving a single print head across the document as required.

The print head 117 is fed with electrical information 100 from a PC board 121 (which includes a micro-processor 122), the purpose of which is to energise selected ones of a plurality of regions spaced apart on the head 117 across the width of the document whereby each energised region causes the thermal 105 deposition of marking material from the ribbon onto the document to permanently mark the same. Thermal print heads, their mode of operation and the electronic circuitry needed to operate them are well known in the art and will not be further discussed 110 here.

The housing 110 also supports a keyboard 123 and an alpha-numeric display panel 124. The keyboard can be used to input formation (e.g. words and numbers) for display on the panel 124 and for controlling 115 the characters printed by the print head 117.

Adjacent to the paper path 116 (in the illustrated case this is downstream of the print head 117 but this need not be so) is an embosser 125. The embosser is designed to print on the reverse surface of a document an alpha numeric pattern embossed on the surface of a card (e.g. a bank guarantee card) pressed against the front surface of the document. The embosser 125 occupies a position in the housing 110 which is on the opposite side of the paper path 116 to a card slot 126. A pressure roller 127 in the embosser 125 can be impregnated with marking ink or it can be used with a separate pressure-sensitive marking ribbon (not shown). The axle of the roller 127 moves 125 along a track 127a, to apply the required marking pressure to the embossed region of the card. Figure 4 130

shows the projecting part 128 of a card inserted in the slot 126.

The housing 110 also exhibits a second slot 129 and an associated magnetic read head (shown dotted at 130 in Figure 4). If a credit/charge card is "swiped" through the slot 129, information magnetically coded thereon can be read and used in the microprocessor 122 to control the further use of the equipment in the manner now to be described.

10 *Model I—Input material*—customer cheque and an embossed banker's guarantee card.

Requirement—In this case the cheque has to be completed on its front face with the payee's name, the date and the amount in words and numbers and 15 on the back with at least some of the information printed from the embossed part of the guarantee card.

Method of Operation—The customer's card is placed in the slot 126 and the customer's cheque is fed, 20 front face down into the inlet 111. Sensing means (e.g. microswitches or photodetectors) sense the presence of the card and cheque and actuate the drum 113 to draw the cheque past the print head 117. The date information required for the print head 25 would normally be preprogrammed into the microprocessor 122, either entered daily or entered when the equipment was installed and updated automatically. The payee information would also be in the memory of the microprocessor 122 but where a POS 30 is used for transactions relating to more than one payee, the keyboard 123 could be used to select which payee from a memorised list of payees is to be used for that particular cheque. The cash amount can be entered via the keyboard 123 or, if the POS equipment is used in association with a cash register, the 35 information required to print the cash amount can be fed to the unit from the cash register.

As the cheque moves past the print head 117 the required information is printed in the format shown 40 in the cheque 30 in Figure 2. Using a thermal print head has the advantage of quietness and a larger available print area but one or more impact matrix printers or ink jet printers could be used instead of a thermal print head.

45 When the printing on the front face of the cheque is completed, the cheque dwells in a position confronting the embosser 125 so that the roller 127 can move along the slot 127a and effect the rear face marking required to properly guarantee payment of the 50 cheque. When the embossing is completed, the cheque is released for hand-removal from the outlet 112. A further final rotation of the drum 113 may, or may not, be required to secure release of the cheque.

Instead of printing from the embossed information 55 in the embosser 125, the required cheque certifying information can be taken from the magnetic stripe on the guarantee card and this can be read by passing (or "swiping") the card through the slot 126. If this method is used, the information required to satisfy 60 the bank's cheque guaranteeing procedure can be printed on the rear of the cheque using a separate head—not shown—or if the bank's rules allow it—it can be printed on the front of the cheque using the head 117.

65 If it is deemed necessary to adjust the positioning

of the lines of print from the head 117 onto the cheque to cover the different formats of cheque likely to be used in the equipment, the information controlling this positioning can be deduced from a code 70 keyed into the keyboard 123, from a sensor reading the bank code from the E13B line on the cheque or where magnetic reading of the guarantee card is employed, from information designating the bank read magnetically from the card.

75 *Model II—Input material*—credit/charge card voucher and customer's credit/charge card.

Requirement—In this case the voucher (supplied by the operator of the POS) can be completed with the date, a brief statement of the reason for the payment, the payment amount in figures, the name and 80 registered number of the POS operator on the credit/charge card company's records, and the credit/charge card number of the customer.

Method of Operation—The customer's card can be 85 passed through the slot 129 so that the necessary customer information is read from the magnetic stripe on the card and fed to the microprocessor 122. The voucher can be fed, like a cheque into the inlet 111, to be printed as it passes the head 117 with stored information regarding the date and POS operator's name and registered number and with keyed-in information relating to the reason for and amount of the payment. With this mode of use the embosser 125 is not required so there is no need to activate the 95 roller 127 or cause the voucher to dwell in the position adjacent to the embosser.

It is possible to produce the required voucher for signature by the customer from a roll (not shown) of blank paper or pre-printed vouchers located in the 100 housing 110, and if this mode of operation applies, there is clearly no need to manually feed a document to the inlet 111 merely to remove the printed sales voucher from the outlet 112 when it appears following the printing operation. A typical voucher is 105 shown in Figure 8.

The presetting of the equipment to write a cheque or complete a sales voucher can be effected in a variety of different ways. For example if the embosser is only used for cheques and the slot 129 is only used 110 for vouchers, the insertion of a card into the appropriate unit 126 or 129 can be used to pre-set the equipment.

Alternatively the pre-setting can be effected via the keyboard 123. This can be done by pressing an appropriate code key (or keys) for each of the two modes 115 of use. Yet again, where separate sales vouchers are used, the leading end of each voucher can include a "select" code (e.g. a bar code, other printed area, a cut out or magnetic marking) which is read by a 120 transducer (not shown) adjacent to the inlet 111 to pre-set the equipment.

In certain circumstances when the slot 126 is used for banker's and credit/charge cards and the coded magnetic information on each is distinguishable as 125 to type of card—the pre-setting can be effected automatically as the card is read following its passage through the slot 126.

Clearly many other modifications are possible within the scope of this invention.

130 Thus, should an outdated card or a card listed as

stolen be detected, the transaction could be aborted.

The equipment could be linked by modem and telephone line to obtain direct authorisation from the bank/credit card/charge card company for the transaction and could print any authorisation number received from such company on the processed document.

Where linking of the equipment to a remote computer is effected, it is clearly possible to operate an electronic funds transfer system using the equipment, in which case the document produced is a hard copy of an effected funds transfer and not a document to be used later to effect such a transfer of funds.

The equipment can also include means to list the transactions processed over a preceding accounting period and the print head 117 can be used to produce such a list on a specially fed-in web of paper. The keyboard 123 can be used to programme the micro-processor to make such a listing.

In addition to giving the name of the payee on a cheque or sales voucher, the equipment can also indicate a POS code number, department number, branch number, lane designation or the like, some or all of this information could also be recalled on a day-end or other accounting period tally.

It is also possible to use the equipment illustrated to print a bar code on each cheque which identifies the amount of the payment. This can be effected using the print head 117 and can be applied to the cheque in a suitable front face area (e.g. see the bar code 41 in Figure 2). At the end of an accounting period each cheque can be fed to an MICR embosser and, using the bar code, each cheque is embossed with the cheque value on the E13B line in the manner required by the clearing banks (e.g. as shown at 42 in Figure 2).

The print head 117 can be a Rohm unit producing 160 dots over a print width of 52.8 mm (i.e. the unit sold under the trade code KE 0802-SI) and the ribbon 118 can be a 50 mm wide TCR ribbon sold by ARMOR under the trade code F 60006.

The unit 130 can be a Panasonic 400 series read only unit.

The equipment shown in Figure 5 comprises a housing 210 having a cheque slot 211 formed in its upper part, the slot 211 extending from end 212 to end 213 of the housing 210. Intermediate the ends 212, 213, the slot 211 is widened to define a cheque card slot 214. Mounted in the housing is a swipe card reader 222.

A data link 215 disconnectably couples electronic circuitry in the housing 210, to an adjacent cash register 216, and a power lead 217 supplies electrical power to the housing 210.

The equipment shown can include a pair of dot matrix printers and can be used to print the details shown in Figure 7 on the front face of a cheque 220 when the latter is inserted upside down, left-edge 221 trailing, in the slot 211. The rear face of the cheque will be printed with the embossed information taken from the area 219 of a banker's card 218 so that when the cheque 220 leaves the slot 211 it is fully completed ready for signing.

The provision of the swipe card reader 222, enables the equipment to print the details shown in

Figure 8 on a voucher 220' also fed into the slot 211 just like a cheque. The voucher can be pre-printed or a blank sheet of paper as shown.

From Figure 7 it can be seen the front-face of the cheque 220 is printed with two lines 232a and 232b, one printed by each dot matrix printer of the pair (although a thermal print head with a print area deep enough to embrace both lines could also be used).

The line 232b includes the date (233), a POS user's code (234) and the POS user's name (235) and the line 232a includes the cash amount in words (237) and in figures (236).

From Figure 8 it can be seen that the front face of the voucher 220' also includes two lines 232a' and 232b'. The line 232a' includes the name of the credit/cash card company (240), an authorisation code (241) from the card company, the POS equipment user's codes (242, 243) and the transaction amount (244).

The line 232b' includes the card number (245), the date of expiry of the card (246) and the date of the voucher (247).

The amounts (237, 236 and 244) are preferably drawn from the cash register 216 and represent the amount shown in the display 216a thereof when a sub-total is called for by the till operator.

The way in which the equipment distinguishes between the two different inputs is shown by the flow chart of Figure 6. The "sensor 1" referred to in Figure 6 is a sensor close to the inlet end of the slot 211 (i.e. close to the end 212) and the "sensor 2" is one close to the inlet end of the slot 214 which indicates the edge 221a (221a') has reached that position.

The "motor" referred to is the drive motor 252 (see Figure 9) used to transport the cheque/voucher through the slot 211, past the front face print position. The "card reader" is the unit 222 and the "till" the unit 216.

The "validate card" stage can be omitted, but where the equipment is on line to the card company and a validation number (or authorisation code) is received direct from the card company this can be printed at 241 on the voucher 220'. If this stage is omitted a validation number can be entered by hand on the voucher 220' prior to asking the customer to sign it.

It will be noted that the data read from the card by the Swipe reader 222 is used only once and the software prevents this information being available to print a second voucher without the card being read a second time by the swipe reader 222.

The swipe reader 222 can be a conventionally available OMRON card reader.

Although it is convenient to have the cash amount transmitted to the unit from an adjacent till 216, it is possible to provide the housing 210 with a keyboard and display much as shown in Figure 1 and this would allow the amount to be entered direct into the software used to operate the equipment of Figure 5.

The provision of the embosser is a useful addition, but is not felt to be essential.

The electronic circuitry for controlling the operation of two matrix print heads 250, 251 and a drive motor 252 in the housing 210 is shown, in broad outline, in Figure 9 and comprises a computer chip 253 which receives data from a computer chip 254 in the

cash register 216 via a transmission control unit 255. When a transaction on the cash register 216 is completed and the final total payable is on display in the display panel 216a of the register 216, a signal is sent to the unit 255 to transmit the data relating to this cash sum down the link 215 to the chip 253 in the housing 210 and control the print head 250. Data needed to control the print head 251 can in part be fed in by the manufacturer (e.g. via a preset unit 256) but facts relating to an initial date, time and a payee's code can be fed down the line 215 using the chip 254 in the register 216. The electronic circuitry can include an electronic clock to constantly update the initially fed-in data regarding time and date.

The motor 252 advances the cheque at a rate coordinated with the operation of the print heads 250, 251, so that the array of matrix dots applied by the two sets of needles along the respective print lines 232a and 232b (see Figure 7) formed by the two print heads 250 and 251 print the information shown in Figure 7. The print head 250 prints the line 232b from right to left, this representing the date 233, a payee code 234 and the payee's name 235 while simultaneously the print head 251 is printing the line 232a, firstly printing head 251 is printing the line 232a, firstly printing the cash amount in figures 236 then in words and figures 237. A motor for driving the ribbon used in the print heads 250, 251 is shown at 257. 258 is a document-sensing switch in the slot 211 which allows the motor 252 and print heads 250, 251 of the front face print position to be energised as the document moves past. 259 is a motor for operating the embossing station associated with the slot 214 and 260 a memory unit which stores information relating to each document (cheque and/or voucher) printed during an accounting period.

The unit shown at 222 in Figure 9 is the swipe reader and a unit shown at 262 is an optical MICR sensing head positioned to read the E13B line on a cheque. It is possible, if the unit 222 and head 262 read cross-checkable information (e.g. the bank sort code), to abort a transaction if there is disconformity between the two pieces of read information. It is also possible to use the read MICR code to programme the printing means relative to the layout of each bank's cheque and this is particularly convenient when a thermal print head is used.

CLAIMS

1. Document printing POS equipment comprising a housing, an inlet for receiving into the housing a cheque or voucher to be printed, conveying means for moving a cheque or voucher fed into the inlet along a document path within the housing, means to read magnetically coded information from a customer-presented card inserted therein, and printing means adjacent to the document path to print information in human readable form on a cheque or voucher on said path, that information including at least a monetary amount in words and/or numbers, means designating the payee and at least in the case of a voucher, data read magnetically from the card.

2. Equipment according to claim 1, in which the information printed on a cheque is the payee's name,

the monetary amount in both word and figure formats, and the transaction date.

3. Equipment according to claim 1, in which the information printed in human readable form on a voucher also includes the expiry date of the card and some detail of the organisation that issued the card.

4. Equipment as claimed in claim 2, in which the equipment also includes means to print in Magnetic Ink Computer Readout (MICR) characters the monetary amount on an E13B line of a cheque fed to the inlet.

5. Equipment as claimed in any preceding claim, in which the monetary amount to be printed on the document is inputted via a series of keys on the housing.

6. Equipment as claimed in any of claims 1 to 4, in which signal processing means is provided in the housing which is adapted to decode impulses received from an adjacent till, whereby the transaction total calculated by the till is automatically printed on the document fed into the housing.

7. Equipment as claimed in any preceding claim, which also includes means to determine whether the document presented to the inlet is to be printed as a cheque or as a credit/charge card sales voucher.

8. Equipment as claimed in any preceding claim, which includes means to list and/or total the monetary amounts of all documents processed on the equipment during a pre-determined period.

9. Equipment as claimed in any preceding claim, in which an alpha-numeric display panel is provided on the housing so that information fed thereto is displayed in human readable form on the display panel.

10. Equipment as claimed in any preceding claim, in which the printing means is a thermal print head.

11. Equipment as claimed in any preceding claim, in which the means to read the magnetically coded information from a card is a card "swipe" unit.

12. Equipment as claimed in claim 3, in which means is provided to compare the read expiry date of the card with the transaction date and to actuate an alarm means if the card is outdated.

13. Equipment as claimed in any preceding claim, in which the housing also includes an embossing station so that embossed information on a customer-presented card is printed on the document.

14. Equipment as claimed in claim 13, in which the means to read the magnetically coded information is separate from the embossing station so that a card is applied differently to the housing if it is desired to read from its magnetically coded information or use its embossed region as a printing member.

15. Equipment as claimed in claim 14 when dependent on claim 7, in which the means for selecting which of a cheque or sales voucher is to be printed, comprises means in the housing to sense whether a card is presented for use in an embossing station or is presented to be read magnetically.

16. Equipment as claimed in any preceding claim, which includes an MICR sensing head in the housing to scan the E13B line on a cheque fed to the input, and means to adapt the format of the printing on the cheque to the layout of the cheque on the basis

of a bank code read by the sensing head.

17. Document printing POS equipment substantially as hereinbefore described with reference to Figure 1, Figures 3 and 4 or Figures 5 to 9 of the accompanying drawings.

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